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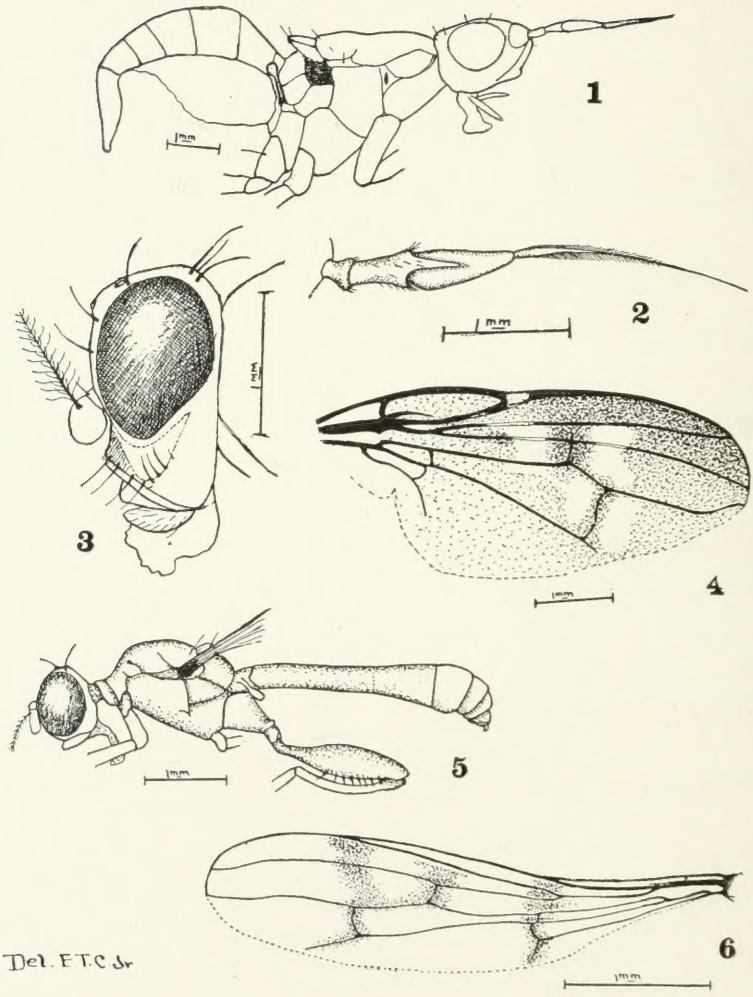

NEW NEOTROPICAL ACALYPTRATE DIPTERA—CRESSON.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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Descriptions of Several New Neotropical Acalyptrate Diptera.

By E. T. CRESSON, JR., Academy of Natural Sciences, Philadelphia, Pa.

(Plate XIX)

The following are descriptions of a few species belonging to little known and interesting genera of the families Micropezidae, Psilidae and Agromyzidae. A few suggestions and notes are also included, relating to the classification of the genera of Micropezidae based upon observations made in the study of this family and of the literature.

MICROPEZIDAE.

From a casual study of the few genera of the Micropezidae, the following is suggested for the sub-family divisions:

Propleura strongly developed beneath, in front of fore coxae; sternopleura beneath, at most, scarcely longer than fore coxae. **Neriinae**

Propleura scarcely developed, sternopleura much longer than fore coxae; fore legs widely separated from the closely situated middle and hind pair ..... **Micropezinae**

The known genera belonging to the Neriinae may be separated as follows:

1 Arista dorsal; fore coxae situated nearer middle pair than to the head ..... **Nothybus** Rond.
Arista terminal; fore coxae situated about equidistant from head and middle pair 2
2 First antennal joint many times longer than second and third together ..... **Macrotoma** Laporte
First joint not longer.
Third antennal joint truncate apically; arista bare **Nerius** Fabr.
Third antennal joint conical; arista apparently much thickened basally... ..... **Telostylus** Bigot

Longina Wied. from Brazil may be synonymous with *Macrotoma,* as suggested by Osten Sacken (1) but comparison of specimens should be made to substantiate this.

Telostylus vittatus n. sp. (Plate XIX, Figures 1-2).

Opake brown: Front yellow with narrow orbits and vertical angles black, somewhat shining; ocellar region reddish; frontal orbits a little projecting and polished black anteriorly; calli at base of antennae polished black, separated from orbit below by a velvety black spot. Face and cheeks pale yellow, orbits narrowly silvery. Occiput yellow, with upper angle and a horizontal stripe at lower orbit, velvety black. Palpi and proboscis pale yellow. First joint of antennae pale yellow; second and third brown; style snow white.

Thorax brownish; mesonotum darker with a broad median pale vitta; a notopleural stripe and pectus pale yellow; scutellum pale yellow, with lateral margins broadly brown or black. Halteres pale yellow. Abdomen brownish, with bases and apices medianly of 2-4 segments more or less pale; venter pale. Legs yellow, with tarsi brown (posterior pair wanting). Wings brownish, more intense towards costa. Auxiliary vein complete ending near apex of first, the latter short ending much before middle of wing; second vein very long, so that second costal section (between ends of first and second veins) about four times length of third section; veins 2 and 3 parallel; fourth gently curving towards third; first posterior cell open; basal cells complete; anterior cross-vein near middle of discal cell; anal cell obtuse. Length (less antennae and ovipositor), 9 mm.

Type Locality.—Bartica, British Guiana, S. A.

Type.— ♀ In the collection at the Academy of Natural Sciences of Philadelphia, No. 5251.

(1) Berl. Ent. Zeit., xxvi, 200, 1882.

This is the first species of the genus to be recorded from the Western Hemisphere, but seems to be a true *Telostylus* and the genus may be further characterized as follows:

Elongate, slender; head produced anteriorly, being much longer than high; eyes roundish; front and oral margin nearly parallel; occiput and face produced beyond orbits; inner and outer vertical, reclinate or erect, decussating ocellar, two frontals and one buccal bristles present, all small; a polished callous-like swelling at base of each antennae; palpi lanceolate, not constricted basally. Antennae elongate, porrect; first joint not longer than third; second with inner margin produced thorn-like along side of third joint; *latter long, conical, with a long thickly pubescent arista at its apex,* the thick pubescence giving it a solid appearance basally. (fig. 2).

Thorax elongate, conically developed anteriorly; propleurae strongly developed in front of fore coxae, causing the latter to be forced nearer the middle pair; the latter and posterior pair close together, the metapleura with a rounded callous-like swelling. Scutellum obtusely triangular, 1 pair prescutellar, 1 supra-alar, 2 notopleurals, 2 scutellar bristles, present, all short, no bristles or hairs on pteropleura. Abdominal segments sub-equal, slightly diminishing apically; ovipositor normal. Legs slender; femora much stouter, with stout but short spines beneath; posterior coxae with a lateral subapical bristle. Wings normal.

The three known species may be separated as follows:

South American species; mesonotum brown with a median pale stripe and a yellow stripe between humeri and wing..**vittatus** n. sp.

East Indian species; mesonotum pale with black spot behind humeri.

Scutellum pale with brown side spots; a black spot above each wing ..... **maccus** O. S.

Scutellum entirely pale; no spot above wings...**binotatus** Big.

Telostylus binotatus Bigot is the genotype with the following bibliography and synonymy.

Telostylus binotatus Bigot. Rev. et Mag. Zool., 1859, 307.

Coenurgia remipes Walker. Proc. Lin. Soc., IV, 164, 1860.

Telostylus binotatus O. S. Berl. Ent. Zeit., XXVI, 208, 1882.

T. maccus O. S. was described from a single female in Berl. Ent. Zeit., XXVI., 207, 1882.

PSILIDAE.

SYRINGOGASTER n. gen.

Head nearly spherical, broader than high; male dichoptic; occiput convex. Front moderately broad in both sexes; inner vertical and greater ocellar bristles alone present. Face flattened or slightly convex, receding below; foveae weak; bristles wanting; cheeks narrow; clypeus, palpi and proboscis well developed. Third antennal joint much longer than second; arista sparingly short plumose. Prothorax elongate, collar-like; mesothorax elongate, attenuated anteriorly; fore and middle coxae widely separated, at least equalling length of middle femur apart; hypopleurae greatly developed posteriorly, cone-like, bearing the hind legs at their extremities; mesonotum quadrate; scutellum very short and broad; metanotum well developed. Only a post-alar and a prescutellar pair of bristles present; pleurae bare excepting sparse, fine pile. Abdomen very elongate, clavate, very narrow basally; first and second segments fused together in a length as long as head and thorax together, the incision scarcely discernible; (fig. 5); lateral margins turned down but not strongly revolute. Hypopygium of male distinct but little developed externally. Legs slender except hind femora which are very much swollen medianly, bearing two series of flexor spines, otherwise legs unarmed; tibiae without preapical bristles; hind tibiae arcuated conforming to the curvature of the swollen femora, and nearly as long; claws small, curved; pulvilli present. Wings not attaining apex of abdomen, attenuating basally, axillary lobe wanting; costal cell very narrow; axillary vein incomplete, more or less fused with first. (see figure).

Type species *Syringogaster rufa* n. sp.

This genus evidently belongs to the *Psilidae* and may be diagnosed as follows:

Elongate, slender; head nearly spherical; front bare except bristles of vertex; face convex, without vibrissae; antennae moderately elongate, decumbent; thorax slender, long, bare, except a few bristles near posterior mesonotal margin; middle and posterior legs removed far caudad with posterior pair situated at apex of conical hypopleurae; scutellum short and broad; abdomen very slender, clavate, first and

second segments very long, fused together; legs slender but posterior femora straight and much thickened, spinose beneath; wings slender; auxiliary veins rudimentary, more or less fused with first; latter short, entering costa before middle of wing; third and fourth veins parallel; discal cell complete; basal cells well developed; anal cell rounded apically.

According to the figure of *Gobrya simulans* de Meij. (Tidj. V. Ent. liv. 363, 1911) this genus seems similar but is very distinct. The generic characters of *Gobrya* given by de Meijere are not as definite as they should be, but if one may be guided by the figure given, the position of the fore coxae will at once eliminate the possibility of synonymy.

Syringogaster rufa n. sp. (Plate XIX, Figures 5-6).

Entirely rufous or yellowish; all bristles black and hairs yellow. Front semiopake with two longitudinal dark stripes above, not well defined; ocellar tubercle violaceous. Face laterally, and cheeks in certain aspects, silvery. Mesonotum subopake, faintly dusted with brown, posterior part, especially laterally, blackish; a black dot in depressions above humeri; scutellum subopake, yellow; pleurae polished; hypopleural suture and apex of hypopleurae above, black. Halteres yellowish white. Abdomen highly polished, but brownish pruinose apically. Anterior coxae, trochanter, bases of middle and hind femora, pale, translucent yellow, nearly white; fore tibiae and all tarsi yellow; hind femora with more or less diffused black basal ring. Wings brownish hyaline, with yellow veins; a transverse fuscous band over apices of second basal and anal cells, a fuscous cloud over anterior cross vein, and a fuscous band over posterior cross-vein extending to costa (fig. 6.).

Front less than a third the width of head. Antennae less than half as long as face. First and second abdominal segments gradually widening apically; third segment about one-sixth to one-eighth as long as first and second together, fourth to fifth or sixth diminishing in length and width. Lateral series of flexor spines on posterior femur confined to the apical two-thirds. Fifth and sixth veins attaining margin of wing. Length 6.25 mm.

Male.—Abdomen with five segments; hypopygium small, yellow. *Female.*—With six segments.

Type Locality.—Rio Surubres, Bonnefil farm, 800 feet altitude. Costa Rica.

Holotype.—♀ Collected Oct. 16, 1909, by P. P. Calvert in sweeping. In collection at the Acad. Nat. Sci., Phila. No. 5252.

Allotype.—♂ topotypic.

Paratype.—♂ topotypic.

Distinguished from the next species by the wings being hyaline with brown bands, the abdomen gradually expanding in width; the third segment much shorter; also in its much larger size.

Syringogaster brunnea n. sp.

Dark rufous or brown. Front and face subopake, latter more yellow, with orbits and cheeks silvery, latter narrow. Antennæ yellow, more or less rufous. Mesonotum subopake or reddish, becoming black in the sutures; scutellum concolorous; pleurae concolorous, polished, becoming black at bases of middle and posterior coxae. Halteres whitish. Base of first abdominal segment subopake, becoming polished apically; fourth to sixth segments subopake, nearly black; apices of second and third black. Fore coxae whitish; femora, tibiæ and tarsi and middle legs entirely, yellow; posterior coxæ and tarsi, yellow; posterior femora translucent rufous, yellow basally and a black spot above at basal third; tibiæ dark; lateral series of spines extending nearly to base of femora. Wings brown, with base, and 3 transverse bands hyaline, first an incomplete band crossing apex of first basal and base of discal cells; second, at basal-fourth of first posterior and apical fourth of discal; third, beyond posterior cross-vein, extending into first posterior cell; these bands all incomplete, not attaining costa, clear hyaline or whitish, becoming indistinct towards the lighter posterior margin of wing.

Front more than one-third width of head. Antennae extending beyond middle of face. First and second segments narrow, suddenly dilating at posterior third; third segment about one-third as long as first and second together; fourth, half as long as third; fifth and sixth, small. Fifth and sixth veins not attaining margin of wing, former extending but little beyond cross-vein. Length 4.5 mm.

Type Locality.—Peralta Station, Costa Rica.

Holotype.—♀ Collected Aug. 10, 1909, (P. P. Calvert). In the collection at the Acad. Nat. Sci., Phila. No. 5253.

Paratype.—♀ Juan Vinas, Costa Rica, near brook on edge of forest, 2500 feet altitude. May. (P. P. Calvert).

Differs from *rufa* in its smaller size, darker color, narrowness of first abdominal segment, and the abrupt dilatation of the second; third segment longer in proportion; the wings are evenly infuscated with hyaline maculations.

AGROMYZIDAE.

Traginops pilicornis n. sp. (Plate XIX, Figures 3-4).

Opake, yellow and brown pruinose. Front black above, rufous towards antennae, with broad orbits and a pair of elongate spots caudolaterad posterior ocelli, yellow pruinose; occiput yellow pruinose becoming cinereous below; lunule cinereous with an isolated, velvety black spot. Middle portion of face cinereous; orbits faintly whitish; vibrissal angle dark; oral margin cinereous. Cheeks yellow pruinose with the flat triangular area below orbits brown. Clypeus brownish; palpi and antennae yellow. Mesonotum yellow pruinose with a complete broad median stripe, a narrow intermediate interrupted stripe, and interrupted lateral margins dark brown. Scutellum concolorous, with two longitudinal brown stripes, apex with a point of light yellow. Pleura yellow pruinose, irregularly marked with brown; metanotum cinereous. Halteres yellow. Abdomen subopake, black; apical margins of segments 2-4 narrowly white, becoming broader and cinereous laterally. Coxae and femora black; apices of latter yellow; tibiae and tarsi yellow; former with subapical and subbasal rings, and latter with apical joints, brown. Wings (fig. 4) infuscated, darker towards costa; with whitish, hyaline spots on disk as figured; veins black except at base, first at jointing with costa, and second and third where crossing white spots of disk, hyaline.

Compact, robust species, head closely applied to thorax. Eyes bare, large. Ocellar plate situated far forwards but little produced conically as with the other species (fig. 3). Three frontals, inner and outer verticals, a post-ocellar pair and an anterior ocellar pair, bristles, well developed, (the latter are broken off in type); frontal orbits slightly converging below. Face short concaved; foveae shallow; vibrissal angles and peristomalia prominent, strongly differentiated from the middle portion of face and area bordering the oral margin, peristomalia bearing a few short hairs and three to four moderately long bristles. Cheeks nearly quarter the height of eye, with a bare triangularly shaped depressed area above peristomalia; a series of about three bristles on anterior edge of lower occipital area which otherwise is thickly hairy. Clypeus distinct but retracted; palpi clavate. Antennae short, situated far below middle of eye level; second joint short with an apical bristle-like hair above; third joint rounded; arista long, *doubly plumose,* having the two usual series of long hairs and two other series of shorter hairs situated at 90 degrees with the longer series. Mesonotum bare, but with a post dorso-central bristle and an intra-alar, close to margin; 2 post-alars; 2 supra-alars; 1 presutural; 1 humeral. Pleura with 2 notopleural and 3 sternopleural bristles. Scutellum triangular, convex, sharply pointed or semi tuberculate apically; with 4 bristles. Abdomen short, (ap-

parently shrunken), ovate; segments subequal in length? Legs normal. Wings extending beyond abdomen?, generally strongly bent at apices of second basal and anal cells; without spines or bristles. Length 6.0-6.5 mm.

Male.—Abdomen with five segments; hypopygium more or less extended. *Female.*—Abdomen with six segments.

Type Locality.—Bartica, British Guiana.

Holotype.—♂, May 21, 1901. In the collection at the Academy of Natural Sciences of Philadelphia. No. 5254.

Allotype.—♀, topotypic.

Paratypes.—1 ♂, 1 ♀, topotypic.

This species differs from all the others in that the front is not produced conically, is larger, and the maculation of the wing is limited to a few whitish areas on the disc, the remainder being brownish, becoming lighter towards the posterior margin. In general, the species is a true *Traginops*, but the arista is curiously doubly plumose. This is the fourth species described in this genus.

EXPLANATION OF PLATE XIX.

Fig. 1. *Telostylus vittatus.*
Fig. 2. *Telostylus vittatus,* mesal surface of an antenna.
Fig. 3. *Traginops pilicornis,* head.
Fig. 4. *Traginops pilicornis,* wing.
Fig. 5. *Syringogaster rufa.*
Fig. 6. *Syringogaster rufa,* wing.

Erium lichtensioides Ckll. vs. Eriococcus artemisiae* Kuw. (Hemip.).

By E. R. SASSCER, Bureau of Entomology, Washington, D. C.

In the fall of 1911 the writer received from Mr. P. H. Timberlake a coccid on *Artemisia californica* collected at Santa Barbara, California, and owing to its great similarity to *Eriococcus artemisiae* Kuwana† it was provisionally identified as such. A subsequent examination of this scale revealed the fact that it also agreed in practically every particular with *Erium lichtensioides* Cockerell,‡ which was described from Fort Collins, Colorado, on *Artemisia frigida.* The fact that

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† Pr. Cal. Ac. Sci., (3), II, p. 399 (1901).

‡ Science-Gossip, n. s., III, p. 199 (1897).

the Santa Barbara material agreed so well with the coccids described by Messrs. Cockerell and Kuwana, even though placed in separate genera, raised the question as to the validity of *artemisiae*. It was therefore deemed wise to make a careful study of the latter species and at the same time compare it with *lichtensioides*. Through the courtesy of Prof. Cockerell, additional material of his species was submitted from Tolland, Colorado, on *Artemisia tridentata*.

In comparing and studying coccids, especially *Diaspinae*, the writer has found it decidedly advantageous to resort to the use of photomicrographs, and this method was followed in going over this material. Two exposures were made, one showing the anterior half of the insect, including the antennae and first pair of legs, and the second exposure exhibiting the posterior half, magnification approximately one hundred and thirty diameters.

In comparing these photomicrographs the resemblance was found to be remarkably close since the capitate dermal spines and the size and number of hairs around the anal ring agree almost precisely, although there was a slight difference in that the antennae and legs of *lichtensioides* did not appear quite so robust as in *artemisiae*. However, the fact that the appendages of *lichtensioides* are a trifle smaller than in *artemisiae* is certainly not a character of sufficient importance to separate them as distinct species, let alone placing them in separate genera.

Possessing six long hairs around the anal opening, as does *artemisiae*, surely excludes it from *Eriococcus*, which is recognized as possessing long caudal lobes, this character being absent in Mr. Kuwana's species, and eight long hairs located around the anal ring. Some specimens of *lichtensioides* present a few scars on the surface of the body and, although they can be seen on Mr. Kuwana's material, they are not so apparent. Small cylindrical pores are to be seen on the surface of both lots of material.

Superficially, the sacs enclosing *artemisiae* and *lichtensioides* are alike in color, although there is a slight difference in size, which is undoubtedly due to the fact that Mr. Kuwana's ma-

terial was taken from the large branches where the insect can reach its maximum growth, whereas Mr. Cockerell's material comes from the small terminal shoots.

As might be expected, a study of the antennae of the two failed to present any salient characters, and as an evidence of the inconstancy of such measurements the following formulae are submitted:

Eriococcus artemisiae Kuwana. Co-type material on *Artemisia* sp. at foot-hills of Sierra Morena, Stanford University, Cal. S. I. Kuwana, Collector, March 24, 1900. [7, 1, 6, 4 (3, 2), 5]; [7, 1 (5, 2) (6, 4, 3)]; [7, 1, 2, 4 (6, 2) 5].

Erium lichtensioides Ckll. Type material on *Artemisia frigida,* Fort Collins, Col. C. P. Gillette, Collector, September 25, 1896. [7, 1 (2, 6), 4 (5, 3)]; [7, 1, 4 (2, 6), 3, 5].

Erium lichtensioides Ckll. on *Artemisia tridentata* from Tolland, Col. T. D. A. Cockerell, letter, February 13, 1912. [7, 1, 2, 3 (4, 6) 5]; [7, 1, 2 (3, 6) 5, 4]; [7, 1 (2, 5) (3, 4) 6].

A careful study of the above formulae and many not included in this paper is conclusive evidence, to the writer, that measurements of antennal joints afford a very weak and variable character since in not a single instance do the lengths agree throughout even when the measurements are made of antennae of the same individual. There is also another feature worthy of notice, viz., the presence of seven- and eight-jointed antennae. This occurs in the material collected by Mr. Timberlake, although the division between four and five is not so prominent. A study of the legs failed to present any substantial characters to warrant a separation.

In conclusion, it is the belief of the writer that *artemisiae* is founded on unstable grounds, since the co-type material does not exhibit any character which would warrant its retention as a valid species. It surely does not belong to the genus *Eriococcus* as it is now defined owing to the presence of only six hairs around the anal ring, a character belonging to the genus *Erium.* Occurring as they both do on *Artemisia* and possessing no features worthy of separation, it is therefore proposed that *Eriococcus artemisiae* Kuwana be reduced to a synonym of *Erium lichtensioides* Cockerell.

Fragments on North American Insects—I.

By A. A. Girault, Nelson (Cairns), North Queensland.

1. **Protective Attitudes of the Caterpillars of Datana ministra Drury (Lepid.).**

The peculiar attitude of the individuals in colonies of young larvæ of this species when at rest was noticed at Blacksburg, Virginia, August 25, 1902; the head plus the thorax are held curved rigidly over the back, while the three distal segments of the abdomen are held in the same manner, but in the opposite direction. Even when in motion, the distal abdominal segments are still upcurved. When individuals in a colony are disturbed, with great suddenness, they wriggle from the leaf and hang suspended by a thread of silk. Disturb the whole colony and they all fall together. Older larvæ form nearly a complete hoop when slightly disturbed.

The significance of the resting attitude above noted becomes evident when we read the following: On September 2, 1902, a badly infested linden tree was shaken violently, dislodging the caterpillars which fell into the grass below; soon a number of tachina flies were noticed buzzing about without apparent aim or resting sharp-eyed upon near-by blades of grass. These had already discovered the caterpillars which were crawling and wriggling about in the grass (if they had not known of them for some time and were waiting about for a chance to attack them). Every now and then, one of the parasites darted suddenly at one of the larvæ and attempted to deposit an egg on its body, not at any point on its surface but on the thorax just behind the head. If unsuccessful, the fly would alight and follow the larva on foot, keeping as nearly behind the head as possible and running along in a peculiar sidelong manner, reminding one of the totally different, yet extremely similar behavior of a courting rooster. It thus followed the crawling caterpillar, over and under, twisting in and out, the blade of grass, flying short leaps when necessary, until at a favorable opportunity the fly would dart at the thoracic region, leave an egg and dart away. These attempts were not always successful; for the pursued caterpillars acted in a manner altogether incomprehensible without attributing it to a sense of fear.

Their movements were a combination of squirms and wriggles amounting almost to convulsion; the fore body was frequently thrown violently from side to side and the caterpillar would often make attempts to remove any eggs placed upon either side by biting or by rubbing or shaking them off. They emit fluid from the mouth. No matter how they would contort themselves, however, they could not reach the region of the cervical shield where the flies were obviously attempting to deposit their eggs. By observation, it was demonstrated that this region was the safest place to lay them. Generally several flies would attack the same larva. Their eggs were often misplaced, occurring on any portion of the dorsal aspect of the body. In one of these cases a caterpillar, upon which there had been two eggs misplaced, removed one by rubbing the head against it. However, misplaced eggs were not always removed within the time limits of the observation. They are easily removed from a caterpillar's body with the hand and are rather easily crushed.

Thus, we have here an undoubted explanation of the resting attitude noted above; the cervical shield is protected by bending back the fore body, while the upcurved hind body aids the protection by preventing access from behind. That the protection is not perfect is to be expected, but it is acted upon by natural selection and only those larvae practicing it obtain the greatest freedom from death following parasitism from those eggs which will be the most successful, namely those placed behind the head. In regard to the origin of the habit in the flies themselves, natural selection has again acted, since only those eggs safely placed would survive. Through the accumulated inheritance of acquired characters, the placing of the eggs in safety would become a habit which by the further action of heredity would become instinctive. As regards the obvious fear expressed in the movements of the caterpillars when being pursued by parasites, it must be considered as being of the same nature as fear in other animals, including man. Here it certainly seems to be conscious, though expected to be unconscious; a horse indicates consciousness by turning

the head to inspect an object or by shying at unaccustomed objects, and is not the caterpillar's behavior the same in degree? Of course it is not; it must be unconscious from the known structure of its nervous system.

(For the possible identity of the parasites, see Insect Life, II, p. 256; III, pp. 26-27.)

2. **Oviposition of the Weevil Lixus concavus Say. (Coleop.).**

At Blacksburg, Virginia, June 8, 1903, a female was observed ovipositing into the stem of a species of dock. The whole operation was completed in about thirty minutes; twenty-seven minutes for excavation of the nidus, one minute in laying the egg therein, and two minutes for smoothing off the cavity. The first thing done by the female was to pull off short parallel strips of the plant's skin, peeling them back about an eighth of an inch and bending them. This was continued until the cavity reached some depth, upon which, the operation being no longer possible (or else the pith being reached), the female inserted the snout into the cavity and enlarged the latter sufficiently to receive the egg. While doing this she was often nearly "standing on her head." The egg was deposited simply by turning in her tracks and applying the end of the abdomen to the excavation. This performed, she again turned slowly and commenced to smooth over the lacerated portions of the nidus; the latter was then filled by pushing adjacent tissue into it and completed by turning back into their places the short strips of skin upon which she began operations. The female then crawled to a leaf and commenced feeding, eating out crescentic areas from its margin. The male was absent, probably due to the late date.

Although this weevil will lay eggs into the stems of rhubarb, the consequent larvae do not seem to be able to mature within that plant, being killed by it.

3. **Notes on Malacosoma americana Fabricius, (Lepid.).**

In Floyd County, Virginia, April 10, 1903, the larvae of this species were observed eating into the buds of apple. In the same place, in two instances, as many as ten old nests were on

single trees, while a half dozen to a tree were common. The 1903 generation in Virginia (Montgomery County) hatched about March 26, upon which date some colonies of the young larvae were observed to have formed a web over the egg-masses. On May 8, it was noted that larvae in woodlands were more advanced than those occurring in orchards. An adult of this generation was captured on June 24 at Blacksburg and the first fresh egg-mass was seen on June 24, 1903, at Cambria. In damp, warm weather, the covering over the egg-mass becomes soft and gummy, due more to the moisture than to the warmth, for when masses in this condition are placed in a warm room they become hardened again; warm water produces the same effect as the warm, damp weather.

Of a number of egg-masses collected March 16, 1903, at Blacksburg, Virginia, from apple, in one case four of them were together, end to end, and in another three; in six cases two masses were together, and in another case two masses were pressed together so as to be indistinguishable (nearly). The manner of deposition of the mass varies considerably; usually, however, they are deposited singly on small twigs and to some extent generally embracing a small offshoot. Thus, in seventy-seven random masses collected, forty-nine were embracing a bud-shoot while the other twenty-eight were entirely away from shoots. In some cases the mass is laid down in a crotch, that is, where many small twigs have their origin, and in others they entirely surround the base of a shoot. Once three eggs laid side by side were found isolated on a twig. During 1903, egg masses exposed to the warmth of a room about the end of the second week in March would commence to hatch after several hours' exposure.

In this species the winter is passed as a perfect embryo within the egg; it is quite probable that some of these hatch before winter sets in, as is indicated by finding holes involving the whole top of the egg in some of the masses. Out of seven thousand five hundred and six eggs obtained early in March, 1903, from twenty random egg masses sixty-four had thus apparently hatched, or 0.85 per cent. The perfect embryos

are grayish in color, the head black, the body with a pallid, soiled line across each segment, and it is clothed with long silky, whitish hair. In Montgomery County, Virginia, perfect embryos were found as early as September 2, 1902.

4. **Thyridopteryx ephemeraeformis Haworth (Lepid.).**

This species has been observed at Salem, Virginia; Annapolis, Maryland, and Paris, Texas. At Annapolis, a male issued September 21, 1902, a female three days later; in the same year the emergence at Salem, Virginia, occurred at the same time or somewhat later, the larvae being half grown or more by the end of July. The species also occurs at Butler, Illinois, and comes to maturity there in the late summer.

5. **Lophyrus abbottii (Hym.).**

This species in late July, 1902, was defoliating portions of several white pine trees at Blacksburg, Virginia. The larvae vary somewhat in detailed coloration; in some of the specimens the black dots at the base of the prolegs are absent, and sometimes the first thoracic segment is dotted with black. Observing a cluster of nearly full-grown larvae at rest, occasionally one is seen to throw back its fore body (head plus thorax) stiffly, holding itself thus for quite a while. Their natural position of rest is to be stretched along a leaf; when disturbed their bodies are jerked backward quickly and a glue-like fluid is emitted from the mouth. When feeding, they begin at the apex of the pine needle or leaf and eat it down to its base; a colony thus denudes the terminal portions of a branch. Pupation commenced on August 2, a number of larvae having been confined in a rearing cage. Subsequently a few adults emerged late in August and some others not until the following July. Pupation occurred in cocoons made within the earth in the cage. A dipterous parasite was noted.

6. **Notes on Automeris io Fabricius (Lepid.).**

A gravid female of this species, captured at Blacksburg, Virginia, July 7, 1902, and roughly confined, deposited a number of eggs the same day; on July 9 the yellow end-spot on the eggs had changed to black; on July 21 the color of the eggs

had changed to lilac, the side spots darker; on July 22, in the morning, the eggs hatched, after a stage of about fourteen and a half days.

The young larvae are gregarious and have a curious habit of traveling in lines, one behind the other, all following the first. Soon after hatching four larvae were noticed thus moving along, all in touch with each other, and all obeying the movements of the first. A portion of an apple leaf was placed in the path of the latter; it was climbed upon without hesitation, tasted, refused and the leader moved on; the others, after a slight hesitation followed without tasting the leaf, thus accepting the decision of the first. The short column moved on and acted in the same manner when a clover leaf was placed in their path. Then a piece of the leaf of corn was placed in the path. The leading caterpillar stopped and, after tasting it several times, began to feed, the others soon advancing and following his example; the line was then broken. If a leading larva of a larger string of the young caterpillars is made to travel in a circle, so that the line gradually becomes circular and finally a complete circle, all of the larvae in touch with each other, they will continue in this condition for hours. I have observed this on several occasions. The gregarious instinct is strong and, as in all social communities of animals, there appears to be some altruism and division of labor, rude though this may be. Later this instinct is lost; it probably has arisen from the fact that the colony of young after hatching once had to search for its food.

The caterpillars were confined and fed; when not feeding they rested in irregular masses or stretched in rows, one behind the other. The first molt began on July 30 and was general on the following day; the larva is very short, its body contracted just after the first ecdysis; when in the second stage the young larvae rested either in masses composed of regular transverse rows or else in a single line as noted above. When disturbed in this stage the anterior end of the body is swept rapidly from side to side, or else the head is simply turned to one side. The second molt occurred about August 15,

and while in the third stage a peculiar gland-like structure was noticed on the first and seventh abdominal segments, just caudo-ventrad of the spiracle; it presents the appearance of a puckered, fleshy wart, undifferentiated in color from the brown of the spiracular stripe; when the larva is disturbed the organ is slightly but quickly inverted or projected. It is probably odoriferous. The third ecdysis occurred on August 22; after this molt it was noticed that the spines of the tubercular setae of the larvae at first cling together parallel to the axis of each seta and overlapping; they are then short and stout, with a very short tip, giving the larva, viewed as a whole, a very peculiar appearance. They then have a dull opaque green color, becoming gradually transparent as the fluid enters them; this also straightens the bent tips; this process can be watched and occurs rapidly. The fourth molt occurred on August 30. The cocoons had been formed by September 29.

These caterpillars are often reputed to be dangerously poisonous. On September 2, 1902, I passed the back of my hand roughly over the back of one of the large larvae, whereupon a number of the spines penetrated and broke off, causing a sharp pain; subsequently much irritation and redness appeared, followed after several minutes by raised white blotches not unlike those caused by stinging jellyfish. These disappeared after about twenty minutes, leaving a blotched redness of the skin which persisted for twenty-four hours; toward the end the raised blotches accompanied by irritation reappeared, gradually disappearing in the following twenty-four hours.

When at rest, in the second stage, the young larvae attach small, tough strands of silk to the leaf. The eggs have been noticed on garden beans.

7. **Notes on Laphygma frugiperda Smith and Abbot (Lepid.).**

A larva of this species which had been fed in the laboratory and which was taken on corn at Paris, Texas, April 26, 1904, having been fed on cross-sections of the stalks of young corn plants, attained full growth about April 30 and at ten o'clock of the morning of that day commenced to enter some earth prepared for it. By the afternoon it was several centimeters

beneath the surface, leaving a small mass of loose earth behind, not unlike that usually found around the entrance of an ant's nest. The larva went to the bottom of the ordinary glass tumbler containing the earth and there pupated; the burrow narrowed gradually toward the bottom; it measured eight millimeters across the entrance and was slightly slanted; the pupa was formed in a vertical position, the head end up and about ten millimeters beneath the top of the soil. The moth emerged during the night of May 19-20.

Another larva similarly captured, confined and fed, entered the earth during the night of May 19-20, 1904, and emerged as an adult in the early morning of June 4, having been beneath the earth about fourteen and a half days; its larval burrow was straight and measured seventeen millimeters long, seven wide at the entrance and only one and a half at extreme bottom. The above moths lived in confinement without food about four and a half days. The soil at the entrance of the larval burrows (pupal cells) is slightly convexed.

8. **On Estigmene acreae (Lepid.).**

About sixteen miles northwest of Paris, Texas, on April 3, 1904, a female of this species was found clinging to the stem of a dead weed, the legs wrapped tightly about it. She was depositing eggs. These latter had been placed in more or less longitudinal rows, the female probably laying transverse rows of them as she crawled slowly upward; there were twenty-two transverse rows, containing from three to eleven eggs each and a total number of a hundred and twenty-one eggs. The mass was covered with a very light network of hair from the abdomen of the female; it hatched on the morning of April 15; no external signs of embryonic development could be noticed; the young hatching larva eats a large hole through one side. The vacated eggs were eaten in some instances.

Out of a mass of two hundred and ten eggs which commenced to hatch at 6 A. M., October 1, 1904, after two and a half days, seventy remained as yet unhatched. These eggs were taken at Paris. The second larval stage differs from the first, principally in lacking the two spots on the head and bear-

ing complex tubercles; while the third differs from the second mainly in bearing more compound tubercles which are darker, the presence of median and dorso-lateral stripes, in being deeper green in general coloration and the generally darker appearance to the unaided eye.

At Paris, Texas, in 1904, this species became increasingly numerous toward late fall (early November) in scattered situations.

9. **Anosia Plexippus Linn.: Length of Pupal Stage (Lepid.).**

On June 2, 1902, at Blacksburg, Virginia, two chrysalids of this species were formed in the laboratory; the resulting butterflies emerged late in the afternoon of June 11, or after a stage of about nine and a quarter days. The butterflies lived in confinement without food until June 20, when they were liberated.

10. **Ceratomia catalpae Boisduval (Lepid.).**

An egg mass of this species was found upon the under surface of a leaf of a catalpa tree at Blacksburg, Virginia, May 26, 1902; the eggs commenced hatching on June 4 following. There were at least five hundred eggs in the mass but they were not counted.

11. **The Pupation of Euvanessa antiopa (Linn.) (Lepid.).**

A closely clinging mass of caterpillars of this species in about the third larval stadium was obtained at Blacksburg, Virginia, July 30, 1902, from a willow tree. They molted on August 4 and again on August 8, and by August 14 were full grown; on the following day one chrysalid was formed while eight of the caterpillars had suspended themselves for pupation. Of these latter, only three successfully transformed—three fell to their death while trying to attach the cremaster (the other two were accidentally killed). On August 16, other larvæ had suspended themselves. The following notes were made:

(1) One suspended larva, August 15, 1902:

Integument parts along dorsum .....10:31½ p. m.
Chrysalid excluded excepting anal segment .....10:34½ p. m.
Anal segment excluded .....10.35 p. m

(Struggle to attach cremaster began at once.)

Cremaster attached .....10:38 p. m
Chrysalid still soft .....12:49 a. m.
Adult emerged—August 25, 1902 .....5:30 p. m.
Duration of pupal stage .....9 days, 19 hours.

During the early afternoon of August 15, 1902, as noted above, eight of the larvæ were found suspended from small pads of silk spun against one side of a twig of willow. They were fixed and held by the claws or minute hooks of the anal prolegs and during the whole afternoon they remained quietly hanging, the dorsum arched, the head neatly tucked in and the legs passively closed. Between 6 and 8.30 P. M., two chrysalids were formed; at about the same time one of the suspended larvæ was removed from its position and laid upon a table (3) in following; the other two were closely observed. Three fell to their death as noted already.

(2) Everything was quiet until 10.30 P. M., August 15, when one of the two suspended caterpillars taken for observation began to move (wriggle) violently as if in agony. A half minute later, the integument parted along the back and the chrysalis commenced to appear, being pushed forward by alternating constriction and expansion of the body. At 10.34½ P. M., after three plus minutes of struggling, all of the body excepting the anal segment had been exposed. The critical stage was now approaching; it occupied more than half of the time of the whole ecdysis. The operation of attaching the cremaster of the chrysalis seems simple enough, but is evidently a critical one; it must be remembered that it is done by instinct, the chrysalis having no previous experience concerning it. The chrysalis has to hold itself by a powerful muscular effort, bending the abdomen in such a manner as to grasp the cast larval skin, then detaching the latter from the anal segment, and then attempt to entangle its cremaster in the silken pad from which the caterpillar had previously suspended itself. After freeing the anal segment, apparently not done without some struggle and seemingly an operation, which, ordinarily would require some practice, the chrysalis has the problem of climbing over the still adhering empty larval integument with nothing to hold on by excepting a very pliable abdomen.

Taking its hold between two of the abdominal segments, by grasping a portion of the larval integument at the incision between the segments, with great strain, the cremaster was slowly moved toward the silken pad; during this operation, the chrysalis also climbed over the larval cast. When the cremaster had approached the silken net, it was attached to it by a striking movement or else simply by dragging it across the surface of the silk. In this caterpillar, this operation took much effort and it very nearly missed the pad altogether. As soon as it had succeeded, however, with a violent movement the larval exuvia was thrown off; the chrysalis then whirled or spun its body a few times, to further entangle the cremaster and make sure of its position. It then remained quiet and after from four to six hours had hardened and become fully colored.

At the beginning, the larval integument parted along the meson of the third thoracic segment, the opening rapidly advancing to the head, the plates of the latter parting obliquely from the meson, along the epicranial sutures. The dorsum of the prothorax is the first portion of the chrysalis to become visible. (In a case observed later, the integument parted at the caudal margin of the second thoracic segment, advancing to the epistoma, after reaching the head, following along the paraclypeal pieces. The ecdysis did not proceed farther, the insect dying).

(3) This caterpillar was removed, after being suspended for some hours, and placed upon its side on a table. It was quiet until 11.06 P. M., August 15, when violent convulsions commenced—forward internal movements from the caudal end as if trying to push through its confining skin. The movements became very violent before successful; the following:

Integument parts at meson of third thoracic segment and reaches the head whose plates part mesially ..... 11.09½ p. m.
Thorax excluded ..... 11:12½ p. m.
Body excluded, except anal segment ..... 11:18¾ p. m.
Cremaster excluded ..... 11:32 p. m.
Made useless attempts to attach cremaster; consider its position.

(4) This caterpillar was quiet until 11.11 P. M., 15 August, when convulsions began. At first it straightened and lengthened the body gently; then violent, spasmodic movements of the thoracic region occurred, followed by the motionless position, which continued until 11.43. At that time the thoracic segments commenced to twitch gently for several seconds, the movement quickly ceasing. At 12.23 A. M., a slight thoracic spasm occurred but no further movements up to 12.50 A. M., when the observation was discontinued. The chrysalis was excluded between 1 A. M. and 6 A. M., August 16, but not successfully, having fallen during the operation of attaching the cremaster.

The struggle to free itself of the larval integument consists of straining movements located chiefly in the caudal portions of the body. The abdominal segments are bent violently, forming a convexity at the prolegs, which flatten again when the movement ceases.

Before suspending themselves, the caterpillars appear to wander considerably and spin much silk at this time.

At 2.20 P. M., August 16, a chrysalis was noticed with all of the thorax excluded. It rapidly wriggled the remaining portions of its body out of the larval skin, to the anal segment and then taking a firm hold of the larval skin with the abdomen (is there a disc-like organ for this purpose near the cremaster?—I failed to look for it at the time, though its presence is indicated in the rough notes), it gradually worked its way from beneath and then over the larval skin, pushing the latter down as its position advanced, thus not raising the body to any considerable angle with the twig. However, after nearly reaching the silken pad, a very small one in this case, this chrysalis was forced to drop, apparently from exhaustion. This observation occupied five minutes.

From the larvæ noted above, the first adult appeared on August 25, 1902, at 5.30 P .M. (from chrysalis No. 2, found at 10.38 P. M., August 15), having been about nine days and nineteen hours in the chrysalis stage. About twenty-four hours preceding emergence of the adult, the chrysalids change to a bluish-black color.

A chrysalis formed at 3 P. M., August 16, 1902, excluded the adult at 10 A. M., August 26, or after nine days, nineteen hours. The butterflies continued to emerge until August 30, in the laboratory, and on that date one was captured out-of-doors.

In 1903, in the same locality, a colony of full-grown caterpillars of this species was found on cottonwood on May 23. They were taken to the laboratory and fed on willow.

June 6, 1903—Pupation commenced.

June 9—Chrysalids.

June 19-21—Butterflies.

This would indicate at least two broods; there is time for three.

On the Genus Anaxipha (Orthoptera ; Gryllidae).

By James A. G. Rehn and Morgan Hebard, Philadelphia, Pa.

An examination of material of the genus *Anaxipha* from the United States shows that two species occur in North America, north of the Rio Grande. It is also true that Scudder's *Cyrtoxipha delicatula* is a synonym of the less well known of the two, *Anaxipha pulicaria* (Burmeister), being based on the long-winged form of this species. We have before us Scudder's type of *delicatula* and other long-winged individuals referable to both species of the genus. The perforation of both faces of the cephalic tibiæ has been considered of great importance in the separation of *Anaxipha* and *Cyrtoxipha,* while the macropterous condition found in forms of *Cyrtoxipha* had not been reported in the other genus. The type of *delicatula* has the tibiæ doubly perforate and the wings are decidedly caudate, but a peculiar facies to the head and pronotum seen in forms of the genus *Cyrtoxipha* is not apparent in the specimen.

We have been able to bring together for examination a considerable number of specimens of both forms of the genus, including a number of long-winged individuals, and we find that while the majority of the brachypterous individuals have the cephalic tibiæ uniperforate, two short-winged specimens of *exigua* have the same portion strongly perforate on both faces,

being, in this respect, exactly like the macropterous ones. All of those in the latter condition have the tibiæ with the perforations on both faces. In consequence it is apparent that the presence or absence of the perforation of the cephalic face of the cephalic tibiæ is variable in individuals which are clearly referable to the same species, hence of neither generic or specific importance in this connection.*

The two species of *Anaxipha* found within our limits are closely related and from the material in hand we find the following characters by which the two can be separated:

A. Ovipositor of female longer, one-half as long as the caudal femora; pronotum less decidedly transverse; caudal femora more elongate, of male longer than tegmina; tympanum of male tegmina with the length little greater than the width.....**exigua**†

AA. Ovipositor of female shorter, not one-half as long as the caudal femora; pronotum very decidedly transverse; caudal femora shorter, of male shorter than the tegmina; tympanum of male with the length at least one and one-half times the width...**pulicaria**‡

In addition to these features, *pulicaria* is always uniformly paler and less maculate, the external face of the caudal femora always lacking the medio-longitudinal line which is almost invariably found in *exigua*, while the generally pronounced facial markings of *exigua* are almost never indicated in *pulicaria*.

Females of *pulicaria* are at first glance liable to be confused with that sex of *Falcicula hebardi* Rehn, but the much more inflated and flea-like caudal femora and slenderer ovipositor of the latter are excellent characters to separate the two. The males, however, are very easily separated by the absence of a tympanum on the tegmina in *Falcicula*.

* The presence or absence of a tympanum on the cephalic face of the cephalic tibiæ has been shown by Saussure (Melang. Orthopt. II, pp. 313, 366) to be variable in two genera of *Gryllinae—Gryllus* and *Gryllodes*.

† *Acheta exigua* Say, Jour. Acad. Nat. Sci., Phila., IV. p. 309, 1825. ["Missouri, near Konza Indian Village," which from the original charts of the expedition is found to be about eighty miles west of Kansas City, on the Kansas River, in Kansas.]

‡ *Gryllus pulicarius* Burmeister, Handb. der Entom., II, abth. II, pt. I, p. 732, 1838. [Jamaica.] For the facts in regard to the use of this name see the author's remarks, Proc. Acad. Nat. Sci., Phila., 1912, p. 274.

A Borborid from an Epiphytic Bromeliad (Diptera; fam. Borboridae).

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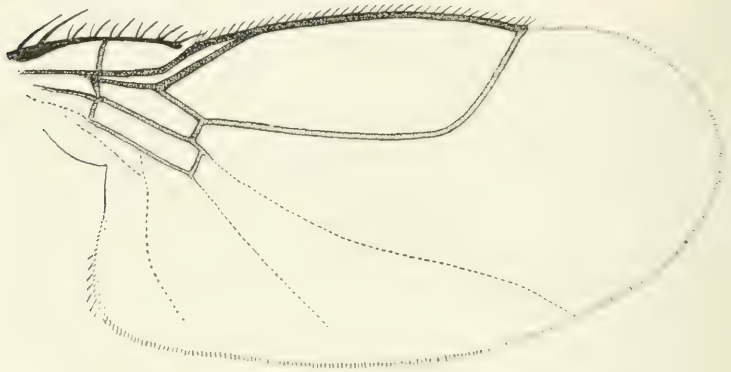
For some time it has been known that certain Bromeliaceae, growing upon the branches of forest trees in tropical America, hold water at the bases of their leaves and that this water forms the habitat of a considerable number of insects, mostly in the larval stage. During his investigations of mosquitoes in tropical America the senior author naturally gave all possible attention to these plants, for they harbor the larvae of a considerable number of species of Culicidae which are restricted to this habitat. It was soon found that, besides the culicid larvae, larvae of a number of other families of Diptera were present, as well as the aquatic larvae of certain Coleoptera and the larvae of a species of Odonata. All these are confined to this habitat. Aside from these many other arthropods, including Myriapoda and many Arachnida, were found to frequent these epiphytic bromeliads, some of them feeding upon the tissues of the plant itself, others upon the vegetable and other debris which collects among the leaves of the bromeliad, and still others in a predaceous capacity or merely to obtain shelter.

On his last visit to Córdoba, Mexico, 1907-1908, the senior author found a group of bromeliads growing well up on a mango tree, perhaps fifty feet from the ground. These were removed and carefully lowered (no small task, on account of the uncertain footing, the weight of the plants and their spiny leaves) and afterwards examined for animals, of which a great variety were obtained. Among other insects breeding in the vegetable debris (kept moist by the water at the bases of the leaves) was the species of *Limosina* here described. While many of the Borboridae are scavengers, and therefore likely to turn up under a variety of circumstances, others have specialized habits. We believe that the present species will prove to be peculiar to the habitat from which it was obtained. As compared with the ordinary scavenger forms

it shows much specialization structurally, particularly in the wing venation with its short costa and the concentration of the veins towards the base of the wing. In this respect it even exceeds *Limosina perparva,* described by Williston from the island of St. Vincent, and which may prove to have similar habits.



Wing of *Limosina bromeliarum* K. and M., n. sp.

Limosina bromeliarum n. sp.

Male and female: Black, subshining; frons opaque except on stripes on which frontal bristles are situated, the central rows nearly parallel and not strongly incurved; face very distinctly produced, shining, concave in centre, one large and 3-4 smaller bristles on cheeks close to mouth edge, jowls bare; second antennal joint with numerous bristles and nearly as long as the somewhat triangular third joint, arista twice as long as breadth of frons, very thin, with long pubescence; dorsum of thorax with regular rows (10) of short bristles, one pair of prescutellar dorsal and one much weaker and widely separated pair of dorso-central bristles; scutellum with four marginal bristles; abdomen short and broad, especially in ♂, the second segment elongated in both sexes, numerous strong lateral hairs in both sexes, ♂ hypopygium large, slightly asymmetrical, with a large central depression and numerous short hairs; legs piceous, fore femora with a series of bristles on ventral surface, the apical three of which are strongest, fore tibiæ slightly dilated towards apex covered with short hairs, basal joint of fore tarsi nearly as long as next three, mid tibiæ with a regular series of three bristles nearly on the dorsal surface and one on postero-dorsal surface at same length from apex as lowest of the other three, hind femora with two

preapical ventral bristles, hind tibiæ dilated towards apices, with numerous short hairs but no distinct bristles, basal joint of hind tarsus distinctly thicker and shorter than second joint; wings yellowish, costa very much short of apex of wing, first section longer than second, second nearly twice as long as sections 1 to 3, third longitudinal vein very obtusely bent at turn and joining costa at nearly a right angle, costa not extending beyond end of third vein, both cross veins very close together, fourth vein obsolete beyond cross vein, fifth barely traceable; halteres brown. Length ½-¾ mm.

Resembles in some particulars *perparva* Will., but very different in venation of wings. Seven specimens, males and females, reared from arboreal bromeliads, March 17-21, 1908.

Córdoba, Mexico. (F. Knab).

Type.—Cat. No. 14,913, U. S. Nat. Mus.

A Bromeliad-Inhabiting Crane-fly (Tipulidae, Dipt.)

By Chas. P. Alexander, Ithaca, N. Y.*

To the rather long list of inhabitants of the Neotropical epiphytic, water-bearing Bromeliaceous plants, (as given by Dr. Calvert in Entomological News, Nov., 1911, pp. 402-411), there should be added the family *Tipulidae*. I have recently received specimens of a Costa Rican *Mongoma* that were bred from Bromeliads by Sr. C. Picado. I am indebted to Mr. Frederick Knab, of the U. S. National Museum, for the privilege of examining these specimens.

Mongoma bromeliadicola sp. n.

Brown; thorax indistinctly striped; femora with a subapical black ring; apices of femora and tibiæ and bases of the tibiæ, white.

Length, ♂, 7.4 mm.; ♀, 8.4-9.2 mm.

Wing, ♂, 7.6 mm.; ♀, 8.5-9.2 mm.

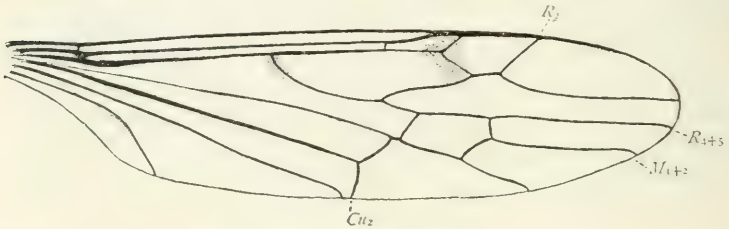
Legs all detached and almost impossible to separate; femora, 8.4-9.8 mm.; tibia, 7.6-10.1 mm.; tarsus, 7.2-8.9 mm. What is probably the fore-leg measures, femora, 8.4 mm.; tibia, 10.1 mm.; tarsus, 8.9 mm. Middle leg: supp. 9-9 mm., tibia 7.6-8.1 mm., tarsus 7.2-7.3 mm. Hind leg, supp., femora 9.6-9.8 mm., tibia 9.8-9.4 mm.

Head: rostrum and palpi yellowish-brown; antennæ dark brown the basal segments rather paler; front vertex and occiput light brown-

*Contribution from the Entomological Laboratory of Cornell University.

ish yellow; a brown stripe along the inner margin of the eye, running from the narrowest portion of the front back to the genæ.

Thorax: mesothoracic præscutum light yellowish-brown with brown longitudinal stripes on either side of the narrow middle line; these stripes begin as two dark dots at a considerable distance caudad of the anterior margin of the sclerite, running backward to the suture and becoming more distinct behind; outer caudal margins of the sclerite rather dark brown, which color is continued backward onto



Wing of *Mongoma bromeliadicola* n. sp.

the sides of the scutum; middle line of the scutum yellowish-white; scutellum purplish-brown with a broad pallid caudal edge; post-notum deep purplish-brown; pleuræ dull pale whitish-brown; sclerite just anterior to the wing-basis darker, brownish. Halteres pale, whitish, throughout. Legs: coxæ and trochanters light brown; femora light yellowish-brown, darkening abruptly to form a sub-apical blackish ring; extreme tip abruptly cream-white in color; tibia: extreme base and tips, whitish, the tip being the broader; remainder of the tibiæ and the tarsi, dark brown. Wings faintly tinged with yellow; veins C, Sc and R brownish-yellow; remaining veins, brown; stigma somewhat triangular, dark brown; a distinct brown cloud at the origin of Rs; tip of wing indistinctly darker. Venation (See Figure). R^2 longer than that portion of R^2+^3 between cross-vein *r* and the fork of R^2+^3; cross-vein *r* longer than that portion of R^2+^3 beyond it; basal deflection of Cu^1 before the fork of M; Cu^2 close to 1st A at their tips, the distance separating the two veins at the wing margin being only about as great as Sc^2.

Abdomen: tergum brown, the lateral and caudal margins of the two basal and the apical segments paler, yellow; in the ♂, the 8th and 9th segments are darker, blackish; the hypopygium brown. In the ♀, the last two segments of the abdomen are narrow, tubular with the valves of the ovipositor very long, slender, acicular. Sternum brown; the margins of the sclerites light colored.

The data for the specimens is a trifle confusing; the following localities were given by Sr. Picado:

Cartago, Costa Rica—1500 meters—Nov.-Feb.; Estrella,

Costa Rica—2000 meters—Sept.; Orosi, Costa Rica—1200 meters—Nov.-Feb.

It is difficult to say just where the specimens were taken. Holotype, ♂— Costa Rica (Sr. Picado, coll.) Allotype, ♀— with the type. Paratypes, 4 ♀'s—with the type.

All of the types in U. S. Nat. Mus. Coll. (Type No. 14,957). The species is conspicuously different from the six Neotropical species of *Mongoma* that are known to me in its striking leg-pattern. Whether or not the long ovipositor has a significance in the manner of egg-deposition is a question for the collector to verify; a similar condition exists in the females of other species and it is possible that these may, likewise, have this peculiar larval habitat. But one *Mongoma* has ever been reared hitherto. De Meijere has recently[1] described the larva and pupa of the East Indian *M. pennipes* O. S. (l.c.; p. 50, 51; fig. 41, pupa). He states that Mr. Jacobson found the larvæ at Semarang (Java), Jan., 1906, in decaying plant-stems.

In conclusion, I would mention the rearing from *Bromeliads* of one of the "false crane-flies" by Sr. Picado, and its recent characterization as *Anisopus picturatus*[2] by Mr. Knab.

A School of Entomology in New York City.

Park Commissioner Stover, of New York City, has decided to establish a school of entomology in Central Park, so that old and young nature lovers may take a practical course in the study of butterflies, bumble bees, dragon flies, beetles and other insects.

The place of study is to be in the Swedish schoolhouse. This building was prepared in Sweden for the Centennial Exhibition at Philadelphia in 1876, as a model of the national schools of that country. After the exhibition the park board bought this building and transferred it to Central Park.

The building will immediately be fitted up. Dr. Edmund B. Southwick, the entomologist of the park department, will be in charge.—*The North American.*

[1] Studien über sudostasiatische Dipteren. Pt. 5. Ostindische Tipulidæ, von Dr. J. C. H. De Meijere. Tijd. von Ent. Apr., 1911; p. 21-79; pl. 4; f. 1-49.

[2] New Species of Anisopidæ (Rhyphidæ) from Tropical America (Diptera; Nemocera), by Frederick Knab. Proc. Biol. Soc. Wash.; Vol. 25, p. 111-114; reprint dated June 29, 1912.

A new Tropical Gonomyia (Tipulidae, Dipt.).

By CHARLES P. ALEXANDER, Ithaca, N. Y.*

The species described herein is referable to the *manca* group of *Gonomyia* Meigen, which, in a more extensive discussion of the genus published elsewhere, I have recognized as belonging to the subgenus *Leiponeura* Skuse. This subgenus is represented in America by the following species: *manca* O. S.; *pleuralis* Will. (*Atarba*); *puella* Will. (*Atarba*); *alexanderi* Johns. (*Elliptera*), and the present species.

This form is closest to *pleuralis*,† from which it differs in coloration and, fundamentally, in hypopygial characters.

Gonomyia (Leiponeura) amazona sp. n.

Wings with cord margined with brown; legs black.

♀—Length, 5.4-5.5 mm.; wing, 3.8-3.9 mm. Fore leg, femur, 2.4-2.65 mm.; tibia, 4.2 mm. Hind leg, femur, 3-3.2 mm.; tibia, 4-4.05 mm.

♂ ♀—*Head.*—Rostrum and palpi dark brownish-black; antennæ, basal segments greatly swollen, orange; flagellum with the three or four basal segments almost white, apical flagellar segments dark brownish-black. Front, vertex and occiput, pale yellowish white.

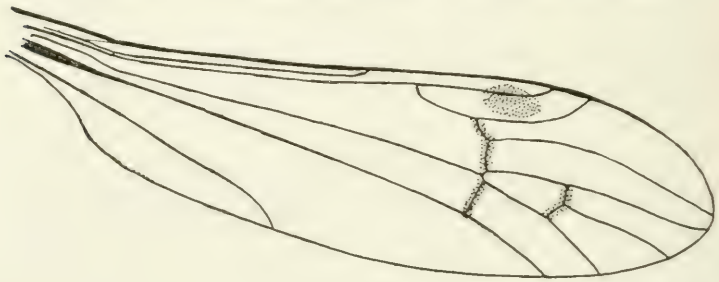


Fig. 1

Wing of *Gonomyia* (*Leiponeura*) *amazona*, n. sp.

Thorax.—Mesonotum, præscutum very light yellowish orange; the lateral margins of the sclerite broadly whitish, separated from the bright color of the dorsum by an indistinct brownish line; scutum brownish-orange, almost concolorous with the præscutum, scutellum and postnotum very pale, almost white. Pleuræ almost white; a broad band extending across the pleural sclerites, beginning on the genæ of of the head, continuing back to the abdomen; the dorsal and ventral margins of this band are darker, deep brown; the ventral mark runs through the halteres, the rest of the band suffusing the mesonotal præscutum with light brown; a narrow, more or less dark colored.

* Entomological Laboratory, Cornell University.

† Williston, Trans. Ent. Soc., Lond. (1896); p. 289; pl. 10; fig. 61.

brown band running across the pleuræ just over the bases of the coxæ; it is only about one-third as wide as the broad pale band separating the two dark pleural stripes. Halteres, basal half of the stem brown; remainder, including the knob, light yellow. Legs: coxæ white; trochanters and femora dark brownish-black, the extreme apices of the latter white; tibiæ and tarsi dark brownish-black; the tarsi rather lighter.

Wings clear bluish-hyaline; veins light brown, C. and Sc. more yellowish; stigma large, rounded oval, dark brown; components of the cord and the outer end of cell 1st M^2 black, the membrane adjoining suffused with darker. All of the longitudinal veins are faintly margined with very pale brown. Venation as in *pleuralis*. (See fig. 1.)

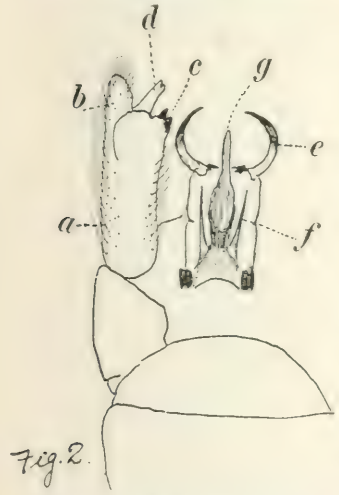
Abdomen.—Tergum, light yellowish, especially bright on the lateral margins of the sclerites; apices of the sclerites dark brownish-black; sternum dull yellow, apices and lateral margins of the sclerites brown Hypopygium (see fig. 2), described below, in key.

Holotype, male, Igarape-assu, Para, Brazil; February 1, 1912 (H. S. Parish).

Allotype, female, Igarape-assu, Para, Brazil; February 7, 1912 (H. S. Parish).

Paratype, 18 females, 2 males, Igarape-assu, Para, Brazil; January 25 to February 7, 1912 (H. S. Parish).

Types in Cornell University, except 5 female paratypes in author's collection and two in Coll. U. S. National Museum. Two females, in poor condition, are referred to this new species. They are from Paramaribo, Dutch Guiana (H. Polah, Coll.), and are in the U. S. Nat. Museum.



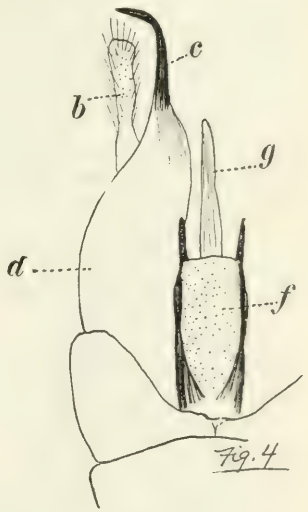
Hypopygium of *Gonomyia* (*Leiponeura*) *amazona* n. sp. Ventral aspect. *a*, pleural pieces; *b*, dorsal apical appendage; *c*, ventral apical appendage; *d*, intermediate apical appendage; *e*, dorsal gonapophyse; *f*, ventral gonapophyse; *g*, guard of the penis.

The following comparison will point out the differences between the species:

pleuralis Will. (Antilles).

Trochanter and femur light yellow, femur light yellowish, subapically brown, tip light yellow. Lower pleural stripe broad, more than one-half as wide as the pale one above it. Pleural stripe very dark brown, clear cut. Wings with uniform veins; cord not seamed with darker. Base of flagellum dark. Hypopygium: (See figs. 3, 4.) the eighth sternite convex; ninth sternite with each of the lateral

pieces triangular, almost or entirely united on the ventral aspect; pleural pieces elongate-cylindrical, bearing two appendages, the lower one (c), a long, chitinized hook bent strongly ventrad near its middle; the dorsal appendage (b), long, slender, fleshy, projecting caudad. Viewed from beneath, a short rectangular organ (f), ending in two short sharp-pointed, chitinized teeth which are curved ventrad; the organ rather chitinized basally and on the sides; behind the above described apophyse, an elongate subchitinized organ (g), undoubtedly the penis guard; it is elongate-cylindrical and directed caudad; above this, a pair of sharp pointed chitinized teeth (e), directed caudad and slightly upward, their base thickened and with a dorsal notch. ♂, Baracoa, Cuba; Sept., 1901; Aug. Busch. (In Coll. U. S. Nat. Mus.)



Hypopygium of *Gonomyia* (*Leiponeura*) *pleuralis* Will. Fig. 3. Lateral aspect; Fig. 4. Ventral aspect. Lettering as in Fig. 2.

amazona sp. n. (Surinam, E. Brazil).

Trochanter and femur dark brownish-black, extreme tip of latter white. Lower pleural stripe narrow, only about one-third as wide as the pale one above it. Pleural stripes usually light brown, not clear cut. Wings with cord and outer end of cell 1st M^2 dark brown, narrowly seamed with darker. Base of flagellum pale. Hypopygium (see fig. 2): the eighth sternite convex, basal piece of ninth sternite triangular; pleural pieces (a), cylindrical, with a short, fleshy dorsal lobe (b), clothed with long hairs at the tip; ventral lobe reduced to two blunt chitinized teeth (c); behind this a broad, less chitinized organ (d). Viewed from beneath, a short, broad, rectangular organ bearing at its apex at either angle, long curved horns (e), shaped like steer's horns, chitinized at the tip; ventrad of this organ, close to its lower face, two sharp needle-like appendages (f), and a sharp-pointed median organ which is presumably the guard of the penis (g). ♂, Igarape-assu, Brazil, Jan. 26, 1912; H. S. Parish. (In Cornell University.)

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.—Ed.

PHILADELPHIA, PA., NOVEMBER, 1912.

At this season of the year when the collections of the past summer are being labeled, when material is being received from and sent to others, when papers based in part or in whole on insects gathered not by the author are being prepared, forget not the collector or the credit due him or her! See that his or her name appears on the pin-label and in the "copy" for the printer. As a well-known entomologist writes: "This is not wholly a matter of personal credit or sentiment. A specimen is worth more for scientific purposes if we know who obtained it and can raise questions concerning it in the right quarter when necessary. I am always indignant when I see a man cite new material and give no credit to the collector; but collectors are largely to blame if they do not put their names on the labels."

An interesting illustration of the value of citing the collector's name is afforded by Dr. Skinner's article on the rediscovery of the longtime rare beetle, *Plusiotis woodii* Horn, in the NEWS for October, 1911, page 356. Horn's citation of of Dr. H. C. Wood as collector enabled Dr. Skinner to write to that veteran and ascertain the probable localities at which the types of the species had been taken.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Note on Anatis 15-punctata and A. caseyi n. sp. (Coleop.).

The varied marking of *A. 15-punctata* is no new thing. Say's *mali* with ocellated spots is as frequent in this vicinity as the typical form. All shades of red and yellow are found and many which are so dark that the spots are, as commonly stated, very "indistinct." However, I have recently taken one which is entirely outside of any description I remember to have seen. It is jet black, with absolutely no discernible spots, indistinct or otherwise. The thoracic markings are pure white, while on all my other varieties the thoracic markings are invariably some shade of yellow. To speak of this insect as *15-punctata* is so flagrant a misnomer that I venture to suggest that this variety be called *Anatis caseyi*, in memory of the fact that at least one coccinellid appears to have succeeded in escaping the notice of so indefatigable an investigator.—O. S. Westcott, Oak Park, Ill., June 29, 1912.

The Splitting of Insect Tracheae.

In studying the tracheae of mosquito larvae, I found the following method to be very useful. This method consists in flattening the tracheal tubes between a glass slide and a cover glass and then splitting the tubes in half longitudinally.

The technic is carried out as follows: First, the tracheal tubes are dissected from the insect and are then transferred to a clean glass slide. The tracheae should remain free from any torn tissue and if possible a small quantity of blood should remain on the tracheae. If there is not sufficient blood, a drop of water will answer fairly well. A clean cover glass should then be put on, pressed down lightly, and the excess of water wiped off to allow the cover glass to fit closely. In working with very small tubes, the success of the operation depends upon the care exercised in causing as close a contact as possible between the cover glass and the glass slide.

After thorough drying, which usually takes a day, the cover glass can either be lifted off or shifted a little to the side so as to uncover the lower half of the tube. If the cover glass is not removed, it should be securely attached to the glass slide in order to prevent further shifting, which may injure the specimen. Prepared in this way the tracheae are ready for microscopic examination.

The advantages of this technic are: First, the whole field can be brought into focus at the same time avoiding the rounding along the edges which is so noticeable in the examination of a whole tube; second, the shape and size of the taenidis, their method of branching, and other minute details can be made out very distinctly, particularly the complicated structures at the juncture of one tube with another; third, all the optical effects due to superimposed striations are wholly avoided. The optical effects just referred to result in the production of a remarkably complicated pattern in the large longitudinal tracheae of mosquito larvae and which has not been noticed in the tracheae of other insects.

By this technic tubes of nearly any diameter from about twenty micromillimeters and upwards can be split in half.—W. W. Thomas, University of California, Berkeley, Calif.

Additional Votes on Priority in Nomenclature.

The following additional votes have been received (see the News for July, 1912, pages 300-304):

Messrs. E. A. Back, R. A. Vickery and C. H. T. Townsend vote (A) that the law of priority should be strictly applied in all cases.

Messrs. H. A. Ballou, H. M. Bower, C. B. Davenport, A. G. Ruggles, H. H. Severin and J. F. Tristán vote (B) against the strict application of the law of priority in all cases and express the desire that the most important and generally used names should be protected against any change on nomenclatural grounds.

The vote taken by the News now stands 98 for A and 197 for B.

Strict Priority Throughout Taxonomic Nomenclature.

I wish to record my vote for strict priority in taxonomic nomenclature, and this includes not only specific names, but generic, tribal, subfamily, family, superfamily and all other group names used in taxonomy, with the self-evident and obligatory qualification that the synonymy of those names above generic up to superfamily shall follow the synonymy of the generic names from which they are formed. I vote thus because I am fully convinced that no other course can secure as great a degree of final nomenclatural fixity. Fixity in this matter here and hereafter is what we all desire. The question is how to secure it now in the highest degree. Fixity depends upon absolute and undivided co-operation, else it is only comparative. In order to secure it now as well as ultimately we must not only have fixed rules for our guidance, which will be generally accepted and acted upon

both now and in the future, but we must all adhere strictly to these fixed rules. If exceptions are admitted today by a majority vote, they establish a precedent. Who can foretell the end of the influence of such a precedent? Where will the line be drawn? Future generations of biologists still unborn have no present voice in this matter, but their voice will be heard in time. Can we speak for them now and say that these exceptions will appeal to the majority of them? They may easily create a commission in the future to overthrow our entire system of nomenclature if we ever begin making exceptions, for exceptions have no end and will undermine any system ever created.

It is evident that the salvation of nomenclatural fixity is the pursuance of a course which will by its very simplicity appeal to human nature at once and forever. The fewer the exceptions the stronger the rule is always true. The stronger the rule the more surely will it stand the test of time is equally true. If the highest possible degree of fixity for the present which will last into the future is what we want, it seems clear how to get it. If strict priority will not get it, nothing will. If we grant exceptions we are weakening the foundation upon which we stand. The International Zoological Congress most wisely framed its rules so as to make the granting of exceptions next to impossible, and I trust that not one exception will ever be granted by it.

As to Meigen's 1800 generic names and all others of like nature, I agree with Hendel, Bezzi and Coquillett that they are valid. The test of a generic name is our ability to place the type species whence it originated. This is the sense of the International Code. According to this, those of Meigen's 1800 genera of which we know the type species must be accepted. His later genera with the same types are certainly synonyms of the earlier ones. The hardship in accepting such changes falls more heavily on the systematist than on any other person. Meigen's 1800 names were highly distasteful to me personally in the beginning and I doubt if I shall ever be able to accept them with complete satisfaction, but their acceptance means to me simply a step in securing final nomenclatural fixity. If they are not generally accepted now, they will be so at some future time. If changes of this nature are inevitable, the sooner they are effected the better it will be for all concerned. Postponement is the enemy of progress.

The large majority votes against strict priority, among zoologists in both Europe and North America, seem to me an exhibition of a desire for past and present fixity at the sacrifice of future and final fixity. Such postponement of change can not result in good.—CHARLES H. T. TOWNSEND, Lima, Peru, July 11, 1912.

A Senator on Medical Entomology.

The Hon. John D. Works uses 78 pages of fine print to try to convince the people of the United States that the bill to establish an independent Health Service would be a pernicious thing. He is the spokesman for all kinds of practitioners of medicine who fear the nation may become too healthy, if the bill becomes a law. He says, "it is claimed to have been discovered that the sting of the mosquito causes yellow fever, the bite of the fly typhoid fever, and that the ground squirrel is the carrier of bubonic plague." We are not aware of the fact that mosquitoes sting, being under the impression from actual experience that they bite. We did not know that the bite of the mosquito is the cause of yellow fever, being under the impression that the cause of yellow fever is unknown. Some flies bite, but we suppose he refers to *Musca domestica* which only tickles. We were ignorant of the fact that the bite of any fly causes typhoid fever as we were taught that the cause of the diseases is the *Bacillus typhosus*. His argument is based on the supposition that such a department would control "methods of healing" or therapeutics, whereas it would have nothing to do with the practice of medicine and should not.

(Speech of the Hon. John D. Works, of California, in the Senate of the United States, April 29th & 30th, 1912).—Henry Skinner.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), excluding Arachnida and Myriapoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published, and are all dated the current year unless otherwise noted. This (*) following a record, denotes that the paper in question contains description of a new North American form.

For record of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington.

4—The Canadian Entomologist. **5**—Psyche, Cambridge, Mass. **6**—Journal, New York Entomological Society. **7**—U. S. Department of Agriculture, Bureau of Entomology. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London.

10—Nature, London. **11**—Annals and Magazine of Natural History, London. **14**—Proceedings, Zoological Society of London. **21**—The Entomologist's Record, London. **22**—Zoologischer Anzeiger, Leipzig. **35**—Annales, Societe Entomologique de Belgique. **38**—Wiener Entomologische Zeitung. **40**—Societas Entomologica, Zurich. **43**—La Cellule. **44**—Verhandlungen, k. k. zoologisch-botanischen Gesellschaft in Wien. **46**—Tijdschrift voor Entomologie. **50**—Proceedings, U. S. National Museum. **77**—The National Geographical Magazine, Washington, D. C. **84**—Entomologische Rundschau. **85**—Bulletin, Societe des Sciences Naturelles de l'Ouest de la France, Nantes. **119**—Archiv fur Naturgeschichte, Berlin. **123**—Bulletin, Wisconsin Natural History Society, Milwaukee. **153**—Bulletin, American Museum of Natural History, New York. **155**—Nova Acta Academiae Caesareae Leopoldius Carolinae Germanicae Naturae Curiosorum, Halle. **161**—Proceedings, Biological Society of Washington. **166**—Internationale Entomologische Zeitschrift, Guben. **169**—"Redia," R. Stazione di entomologia Agraria Firenze. **179**—Journal of Economic Entomology. **182**—Revue Russe d'Entomologie, St. Petersburg. **190**—Deutsche Entomologische Zeitschrift "Iris," Dresden. **193**—Entomologische Blatter, Cassel. **194**—Genera Insectorum, Diriges par P. Wytsman, Bruxelles. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **199**—Bulletin, Societe Scientifique et Medicale de l'Ouest, Rennes. **201**—Memoires, Societe Entomologique de Belgique. **204**—New York State Museum Bulletin. **209**—Transactions, Zoological Society of London. **239**—Annales, Biologie Lacustre, Brussels. **240**—Maine Agricultural Experiment Station, Orono. **277**—Victorian Naturalist, Melbourne. **284**—Bulletin, Museum National d'Histoire Naturelle, Reunion Mensuelle des Naturalistes du Museum, Paris. **285**—Nature-Study Review, Urbana, Illinois. **320**—Der Tropenpflanzer, Berlin. **324**—Journal of Animal Behavior, Cambridge, Mass. **335**—Smithsonian Miscellaneous Collections. **359**—Connecticut Agricultural Experiment Station, New Haven. **365**—Collections Zoologiques du Baron Edm. de Selys Longchamps, Bruxelles. **367**—International Entomological Congress. **368**—The Monthly Bulletin of the State Commission of Horticulture, Sacramento, Cal. **369**—Entomologische Mitteilungen, Berlin-Dahlen. **392**—The Irish Naturalist, Dublin. **393**—"Scientia," Bologna. **394**—"Timehri," The Journal of the Royal Agricultural and Commercial Society of British Guiana, Demarara. **395**—Revue Mensuelle de la Societe Entomologique Namuroise, Namur.

GENERAL SUBJECT. Anon.—The second international congress of entomology, **8**, 1912, 204-207. **Anon.**—Der II. internatio-

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Elementary Entomology, By E. Dwight Sanderson, Dean of the College of Agriculture, West Virginia University, Director West Virginia Agricultural Experiment Station, and C. F. Jackson, Professor of Zoology and Entomology, New Hampshire College. Ginn & Co., Boston. New York, Chicago, London. 8vo, cloth, pp. vii, 372, 496 figs., price $2. Not dated on the title-page. Copyrighted 1912 by the authors.

This is intended by the authors as a text for beginners and "is confessedly very largely a compilation from the works of others." The right and proper ground is taken that general entomology is the foundation upon which economic entomology is to "be erected, and without a knowledge of the elements of entomology a course in economic entomology will have but little meaning to the average student, whereas if the more general knowledge of the subject has been mastered, the study of the various insect pests may be profitably pursued by the individual, even if he has not been able to take a systematic course in that phase of the subject."

After an Introduction of four pages, in which the pathologic and economic importance of insects to man is briefly stated, the book is divided into three parts. Parts I., The Structure and Growth of Insects, (pp. 5-66) and II., The Classes of Insects, (pp. 67-274) are by the senior author; Part III., Laboratory Exercises, (pp. 275-358) by the junior.

In comparison with some other text-books of about the same size, Part I. is much less detailed than the corresponding parts of the well-known texts of Folsom and of Carpenter, but of nearly the same length as that of Smith. Part II. is much longer than Folsom's treatment of the same topic, but not more extended than those of Smith and of Carpenter. There is but little, and that incidental, in this new book corresponding to Carpenter's chapters on Insects and Their Surroundings, and The Pedigree of Insects, or to Chapters IV to XIII of Folsom. A strictly economic section, which might perhaps have included some of the material of Smith's Part III. (Insecticides, Preventives and Machinery), has been intentionally omitted by Messrs. Sanderson and Jackson, as tending to make the book "too cumbersome; indeed, it is usually not possible to cover both elementary and economic entomology in a single course."

From the three older texts this work differs in giving Laboratory Exercises (Part III.), which are a less usual feature in entomological manuals. These exercises deal with the External anatomy of the locust (*i. e.* grasshopper), A comparison of the different types of Arthropoda, A comparison of different types of insects: bee, fly and beetle, The internal anatomy of the locust, The mouth-parts of insects, The life-history of insects, and The classification of insects. Sixty-seven

exercises on these subjects are arranged for, following which are two chapters on Methods of collecting insects, and Methods of preserving and studying insects. For exercises 59-67 on classification, a compact series of keys to the orders and many families of insects is provided (pp. 303-329).

A list of books for the reference library, pp. 360-361, is decidedly one-sided, as no other order than the Lepidoptera is represented. As indicated above, there are many figures; they are both old and new; figure 53 would seem to be that of a *male*, rather than of a female, mosquito.—P. P. C.

Doings of Societies.

ENTOMOLOGICAL CLUB, LOS ANGELES, CAL.

At an informal meeting and banquet held on Thursday evening, May 2, 1912, at Christopher's Broadway Café, the following thirteen men were present: A. Davidson, J. R. Haskin, H. H. Newcomb, R. L. Beardsley, H. B. Dixon, C. O. Esterly, V. W. Owen, John Comstock, C. A. Whiting, F. C. Clark, E. Nichols, G. C. Davis and F. Grinnell, Jr.

Prof. C. O. Esterly, of Occidental College, gave a talk, illustrated with living specimens, and drawings, of the Oil Fly, *Psilopa petrolei* Coq., the larvae of which live in great numbers in the pools of crude petroleum near Los Angeles. Dr. Davidson told of the first discovery of this insect about 1895; Coquillett described it in 1890, but its full biology had not been studied till this year. The larvæ have a special interest for the student of animal behavior, reactions to external stimuli, etc., which were especially touched on by Prof. Esterly.

Mr. H. H. Newcomb gave a short account of the problems presented in the genus *Limenitis*, of which he has made a special study; he exhibited enlarged photographs of the species.

Mr. Grinnell exhibited a box of specimens of the interesting Noctuid genus *Tarache*, which is extensively represented in the Southwest. Also specimens of *Ephydra tarsata* from Owen's Lake, adults, larvæ and pupæ; and *Ephydra* sp. from a salt pool near Santa Monica, and specimens of species of

Hippoboscidæ and Nycteribiidæ from a bat, a deer and specimens of an unknown species caught flying in the bright sunshine.

Enthusiastic discussion followed the communications and exhibitions; the meeting finally adjourning at 11 P. M.

The Club met in the office of Dr. A. Davidson, in the Wilcox Building, Los Angeles, Cal., on Thursday evening, June 6, 1912, at 8 o'clock, with the following persons in attendance: H. H. Newcomb, A. Davidson, A. G. Smith, K. R. Coolidge, W. Bollerman, H. Hehre, R. M. Caldwell, Mrs. E. P. Van Duzee, E. H. Van Duzee, V. W. Owen, H. B. Dixon, R. L. Beardsley and F. Grinnell, Jr.

Mr. F. Grinnell, Jr., read an account of the pioneer entomologists of California, illustrating with photos, maps, blackboard outline, letters and books. He divided the history of entomological study in California into five periods, as follows: 1791-1848 coinciding with the Spanish Colonial period in California, and marked especially by the activities of Russian Naturalists, and various scientific expeditions; 1849-1859, period of the Mexican Boundary Survey and Pacific Railroad Survey, founding of the California Academy of Sciences and the activities of Behr and Lorquin; 1860-1870, the period of the State Geological Survey and J. D. Whitney; 1870-1890, after the opening of the Pacific Railroads many new collectors came in, Stretch, Rivers, Henry Edwards, etc., 1890- to the present time, the period of the two universities.

Mr. H. H. Newcomb gave an account of his methods of collecting and preserving insects; exhibited a copy of Week's Illustrations of Diurnal Lepidoptera, a nicely printed and illustrated work; a specimen of a Belostomid with the usual mass of eggs on the wing covers.

Mr. Grinnell exhibited a box of Noctuids, including some rare species, and a specimen of *Lycaena exites* mounted as a novelty by the Denton Bros., for a necklace.

Mr. Owen showed specimens of a *Neophasia*, probably *Menapia* from the South central Sierras; and species of *Gloveria* from Arizona.

Mr. Coolidge presented descriptions of the early stages of some butterflies; *Lycaena sonorensis, Thecla dumetorum,* and *Lycaena acmon.*

Meeting adjourned at 10.30.

The Entomological Club met on Thursday evening, August 1, in Dr. Davidson's office in the Wilcox Building, Los Angeles. The following were present: H. H. Newcomb, J. R. Haskin, A. Davidson, F. Grinnell, Jr., H. Hehre, Ralph Benton, P. H. Timberlake, J. C. Bridwell, C. L. Edwards, F. C. Benedict, H. W. Allin, Mrs. S. P. Wheeler and some visitors.

Mr. J. C. Bridwell gave a very interesting and lengthy account of the bees and wasps of California, referring to their possible past origin and distribution, and the lifezones as studied on the San Jacinto Mountains where he spent a month. He exhibited a large collection of these insects, including a new genus of *Scoliidae,* five specimens of which have been so far taken in this vicinity, with nearest relatives in South America, Australia and Madagascar. He referred to the mimetic relations of these insects, showing some mimics in various orders.

Dr. Davidson described the habits of the parasite of the trapdoor spider, with blackboard sketches.

Dr. F. C. Clark, not able to be present, sent some boxes of Hymenoptera and Diptera for exhibition.

General discussion. Adjourned at 10.30.—F. Grinnell, Jr., *Acting Secretary.*

OBITUARY.

Ludwig Ganglbauer, the eminent Coleopterist, died on June 5, 1912. He was born in Vienna, October 1, 1856, studied in the University of his native city and, in October, 1880, was appointed to succeed Dr. H. Krauss as custodian of Coleoptera in the Imperial "Hofcabinet," with the rank of Assistant. He became Custos in 1893 and Director of the Zoo-

logical Department of the Imperial & Royal Museum, in succession to F. M. Brauer, in 1906. His chief work is the *Käfer Mitteleuropas,* 1892-1904, in four volumes. He suggested many improvements in the classification of the beetles, and a critical synopsis of his views was recently given by Mr. C. J. Gahan in the *Entomologist* (London), April-December, 1911. He was one of the founders of the *Wiener Entomologische Zeitung,* and was elected an Honorary Member of the Entomological Society of London in 1896. (Abridged in part from the notice, accompanied by a portrait, in the *Entom. Month. Mag.,* Sept., 1912.)

The Rev. Thomas Blackburn, who died at Adelaide, South Australia, May 19, 1912, at the age of more than 70 years, was of English birth. His residence in the Hawaiian Islands in 1876-1882 gave him opportunities for collecting insects there and he published on the Coleoptera of that fauna. A few years later he removed to Australia, where he likewise devoted himself to the beetles, publishing a number of memoirs on them in Australian journals. His types have been acquired for the British Museum of Natural History. (*Ent. Mo. Mag.,* Sept., 1912.)

George Masters, a native of Kent, England, who went to Australia about 1860, collected and catalogued Australian Coleoptera, and became, in 1874, curator of insects in the Macleay Museum, University of Sydney, died in Sydney, June 26, 1912, aged 75. (*Ent. Mo. Mag.,* Sept. 1912.)

We regret also to have to record the death of G. H. Grosvenor, of Jesus College, Oxford, whose kindly services at the recent International Congress of Entomology in that city will be remembered by all who were present. He spent some time in the United States in entomological study about a year ago. He was drowned off the Cornish coast, on September 4, when trying to save the life of another.

EXCHANGES.

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☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued

Lepidoptera for exchange—A number of butterflies from the southwest, such as *A. strigosa, Synchloe californica, Melitaea neumoegeni, M. quino, L. mormo, C. australis.* Correspondence desired on special material desired from this section.—J. R. Haskin, 936 Manhattan Place, Los Angeles, Cal.

Tom Spalding will collect 1912 Utah Lepidoptera, Coleoptera, etc., particularly Papilionidae, Catocalae, Cicindelidae.—Provo, Utah.

Wanted—Tipulidae (Craneflies) from any part of the Globe, but especially of North America. Will buy for cash or give exchanges in Coleoptera, Lepidoptera or Coleoptera.—Dr. W. G. Dietz, Hazleton, Pa.

The Entomological Exchange—For the exchange of Lepidoptera amongst reliable collectors in all parts of the world. For further information, address with return postage, Rudolf C. B. Bartsch, Secretary, 46 Guernsey St., Roslindale, Boston, Mass.

Rare Saturnidae and Parnassiinae as *Act. selene, Callandra* (new), *Sat. pyretorum, pearsoni* (new), *Hemileuca burnsi* (new), and 60 other species to exchange for American Saturnids and Parnassids, *Calleta* and *eversmanni.*—J. Henry Watson, 70 Ashford Road, Withington, Manchester, England.

For Exchange—Have for exchange Cicindelidae in sets; also other Coleoptera for Cicindelidae and Cychrus not in my collection.—Adolph Mares, 2517 Homan Ave., Chicago, Ill.

Chrysochus cobaltinus Lec. for exchange.—R. J. Smith, Milpitas, Santa Clara, Co., Cal.

Wanted for exchange—Coleoptera for native or exotic specimens—Cicindelidae, Carabus, Cychrus, Calosoma, Lucanidae, etc. List on application —Frank Psota, 1142 S. Whipple St., Chicago, Ill.

Dynastes hercules beetles direct from the original collector. Two new localities, namely St. Lucia and British Guiana, also from Dominica; for sale or exchange.—A. F. Porter, Decorah, Iowa.

Wanted—Living pupae of Saturnid moths. State quantity and price. Phil. Rau, 4932 Botanical Ave., St. Louis, Mo.

Change of Address—F. H. Wolley Dod, Millarville, Alta, to Midnapore, Alta.

For Exchange—*Cychrus andrewsii* and *Cychrus ridingsii* with full data.—T. N. Brown, 71 Highland Ave., Uniontown, Pa.

Wanted for Cash or good exchange, all American live pupae and cocoons, and 100 or more North American Parnassius in paper not expanded. Give nice exotic Lepidoptera and nice large Coleoptera.—Communicate with Monsieur Frank Sever, 333 E. 49th St., N. Y. City.

Lepidoptera—Specimens of diurnals from this section in exchange for other N. A. species new to my collection.—R. A. Leussler, 1137 S. 31st St., Omaha, Neb.

CATOCALAE FOR SALE.

C. desdemona, **beutenmulleri*, *ilia* var. sp. *aholibah*, *coloradensis*, *pura*, *faustina* and several varieties, *irene*, and varieties *aspasia* var. sp. **zillah*, **lydia*, *verecunda*, *edwardsi*. Only a few left of species marked*.

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